HEARING CONSERVATION PROGRAM

EAR DISORDERS AND HEARING LOSS

26 Jan 2013

LEARNING OBJECTIVES

1. Define the five types of hearing loss
2. Describe medical and communication symptoms that are characteristic of each type of hearing loss
3. List common causes of and basic treatment for each type of hearing loss
4. Explain how impact and continuous noise exposure affects ear structures and functions

OHC TECHNICIAN RESPONSIBILITY

YES

General Knowledge for Referrals

NO

Diagnosis of

- **Type of Hearing Loss**
- **Ear Disease**

Recommendations of Treatments

FIVE TYPES OF HEARING LOSS

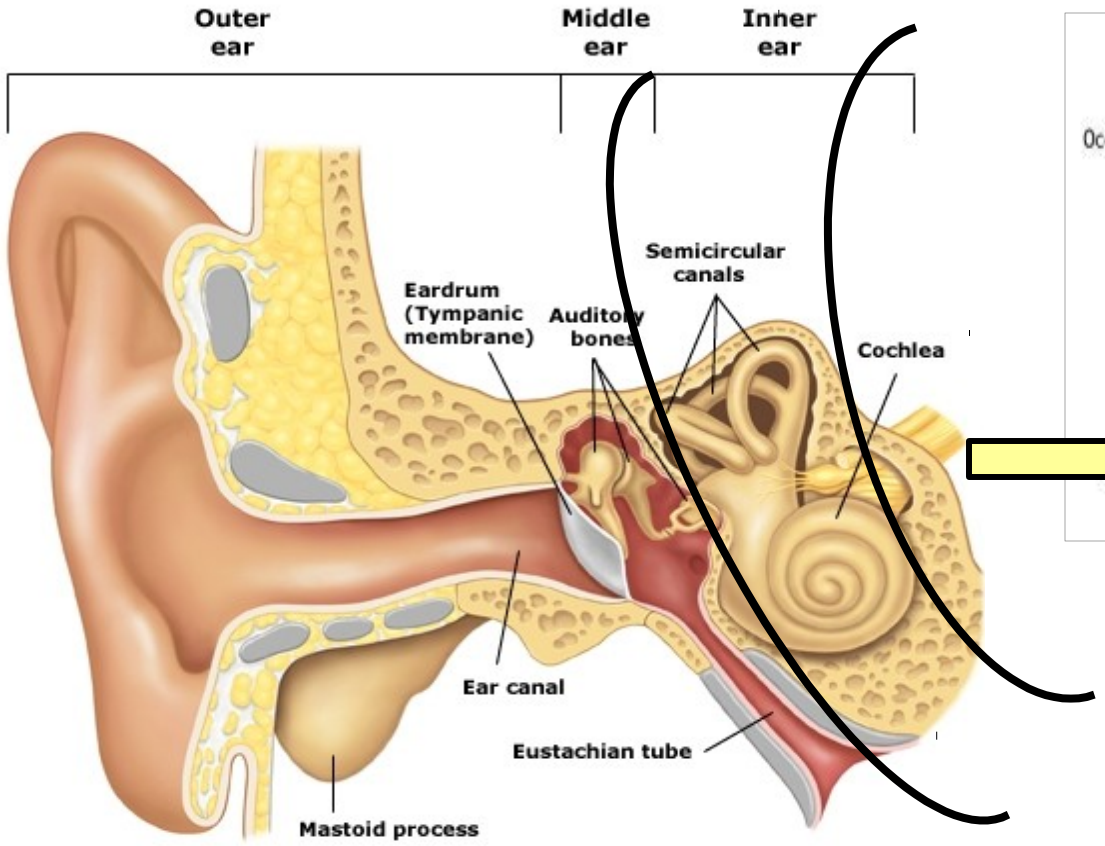
1. Conductive hearing loss
2. Sensorineural hearing loss
3. Mixed hearing loss
4. Central hearing loss
5. Non-organic or Functional hearing loss

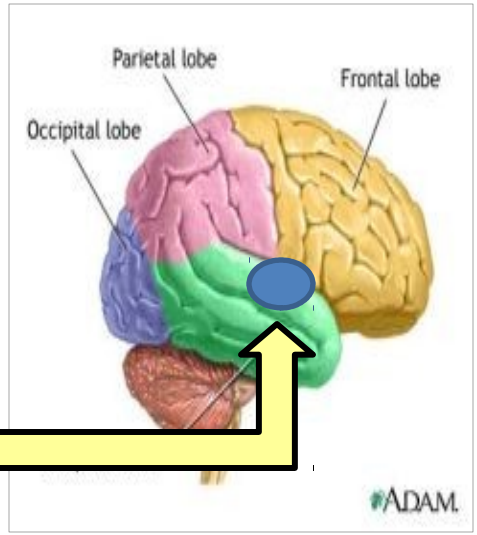
Five Types of Hearing Loss cont…

CONDUCTIVE

SENSORI-NEURAL

CENTRAL





MIXED HEARING LOSS

Outer & Middle Ears

CONDUCTIVE HEARING LOSS

Symptoms

- Talks softly or reports "talking in a barrel"
- Understands speech with increased volume
- Congestion – cold
- Low pitched ringing or crackling sounds

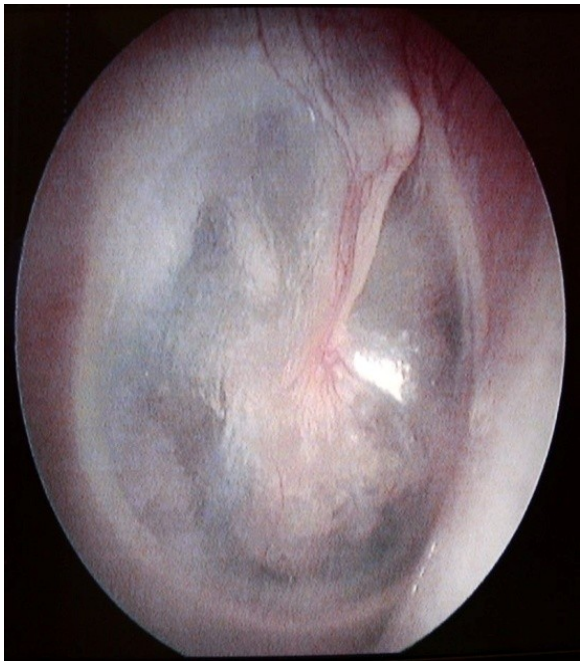
Low frequency or flat hearing loss

Hearing Test Results

500	1000	2000	3000	4000	6000 Hz
35	30	25	15	10	10 dB

Abnormal otoscopic exam tympanogram

Normal Ear Canal and Eardrum



Outer & Middle Ears

CONDUCTIVE HEARING LOSS
Diseases and Disorders

Impacted Cerumen

Complete Occlusion

Outer & Middle Ears

External Otitis or Infection

Outer & Middle Ears

Conductive Hearing Loss: Diseases/Disorders cont…

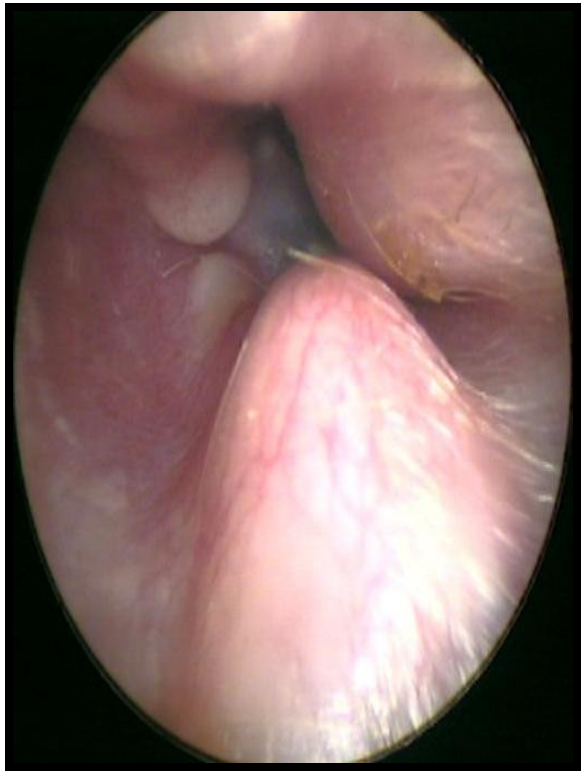
Dermatitis

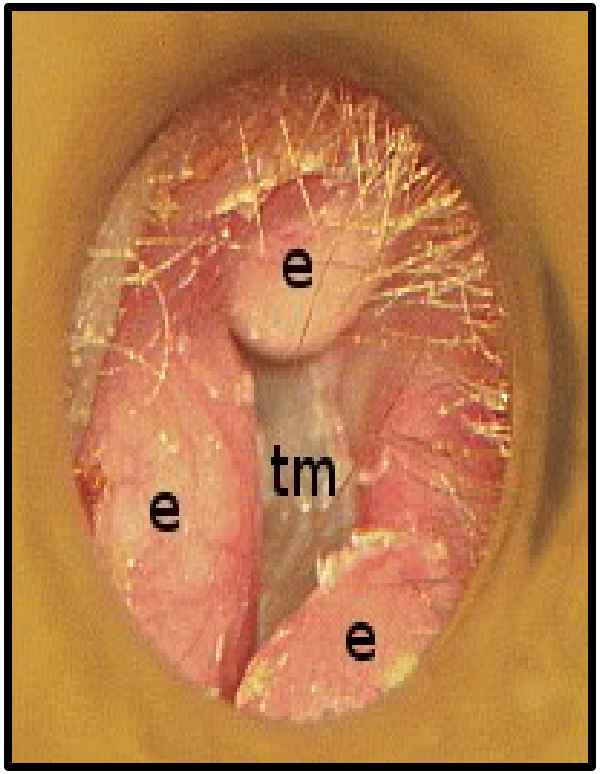
Basal Cell

Outer & Middle Ears

Exotosis

Bony Growths or Protrusions

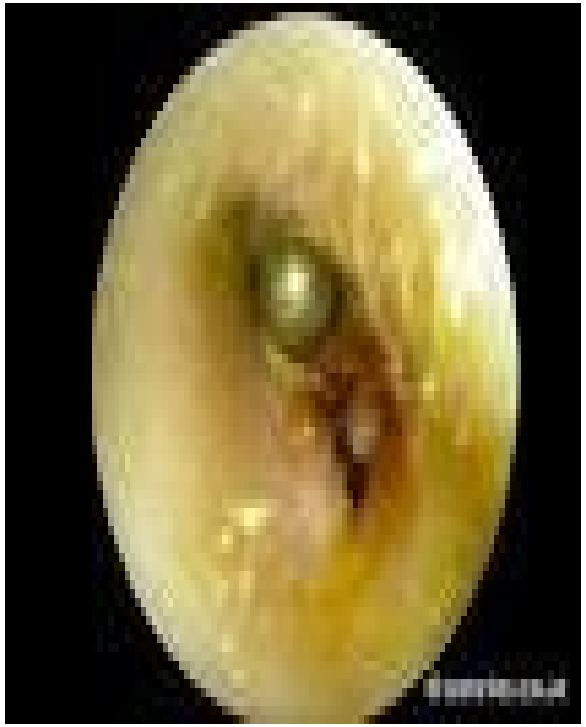




Outer & Middle Ears

Foreign Objects

Ball Bearing



Stick

Insect

Outer & Middle Ears

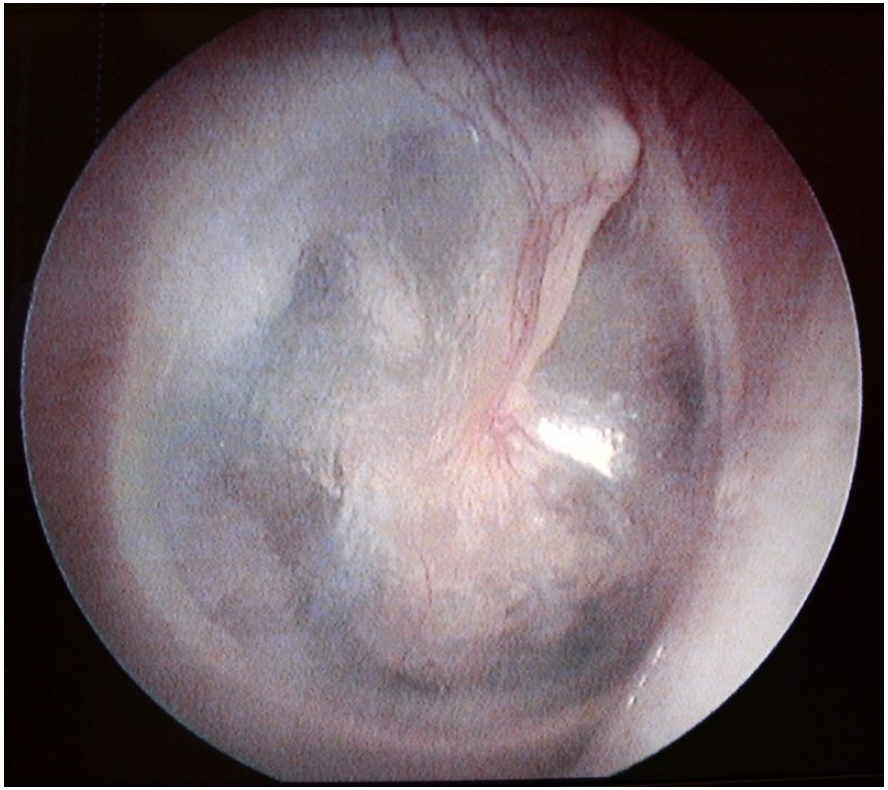
Ear Canal Fungus

Outer & Middle Ears

Congenital Atresia

Outer & Middle Ears

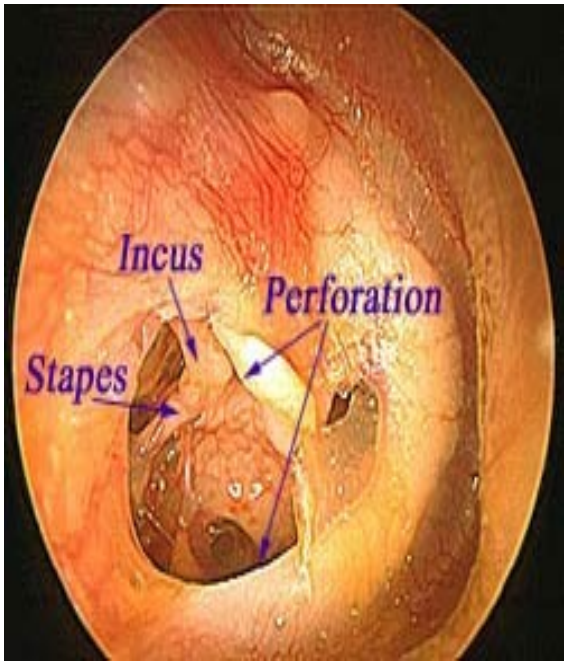
Reminder: Normal Eardrum



Outer & Middle Ears

Conductive Hearing Loss: Diseases/Disorders cont…

Tympanic Membrane Perforation



Outer and Middle Ears

Conductive Hearing Loss: Diseases/Disorders cont…

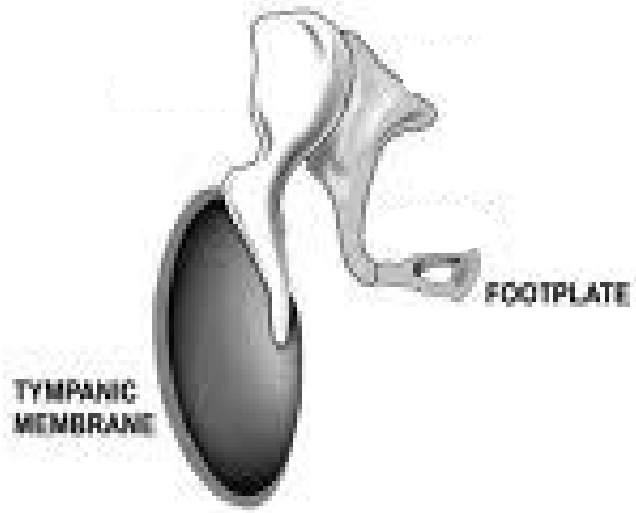
Ossicle Related

Detached

Stiff – fixated

Eroded

Birth related



Outer & Middle Ears

Conductive Hearing Loss: Diseases/Disorders cont…

Eustachian Tube Dysfunction

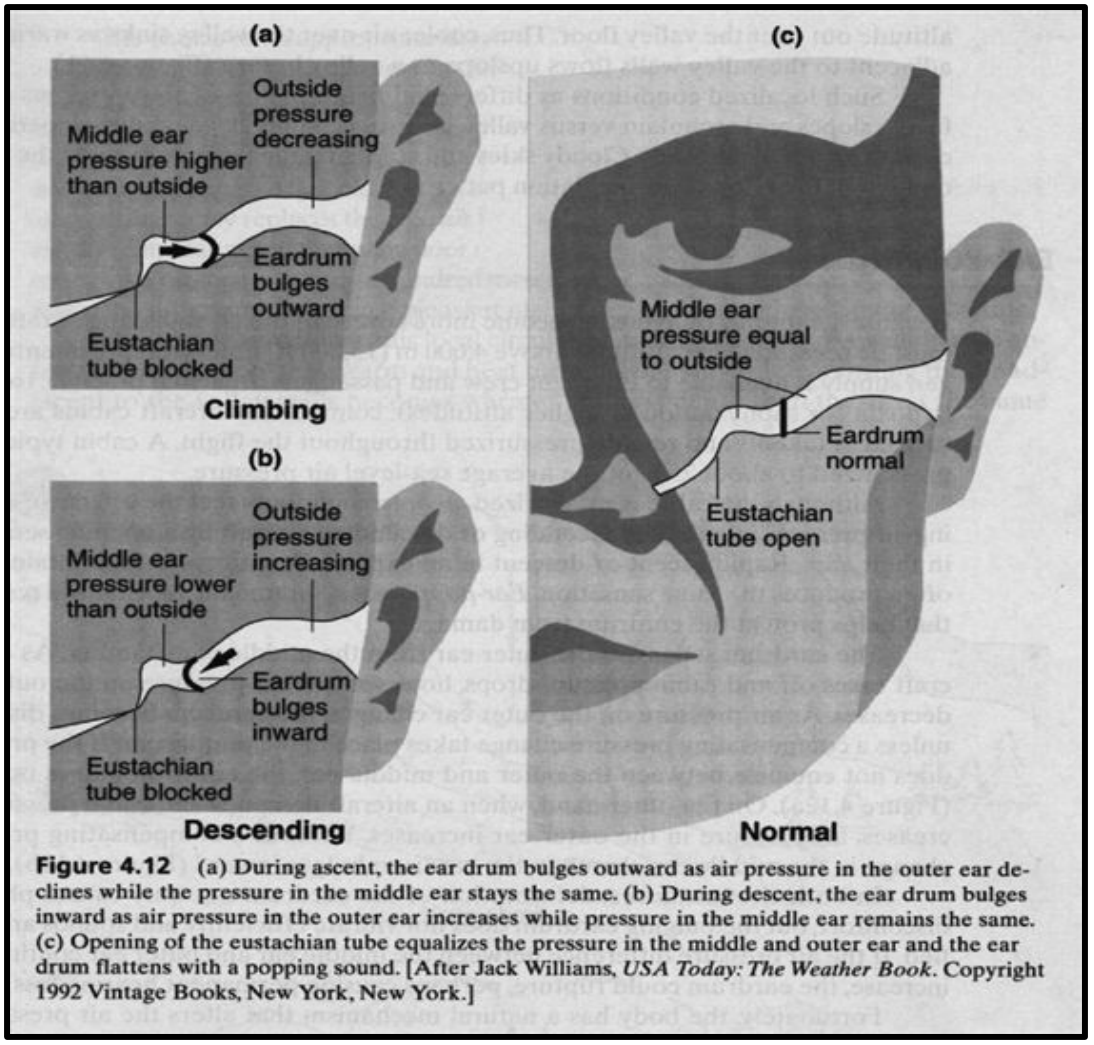
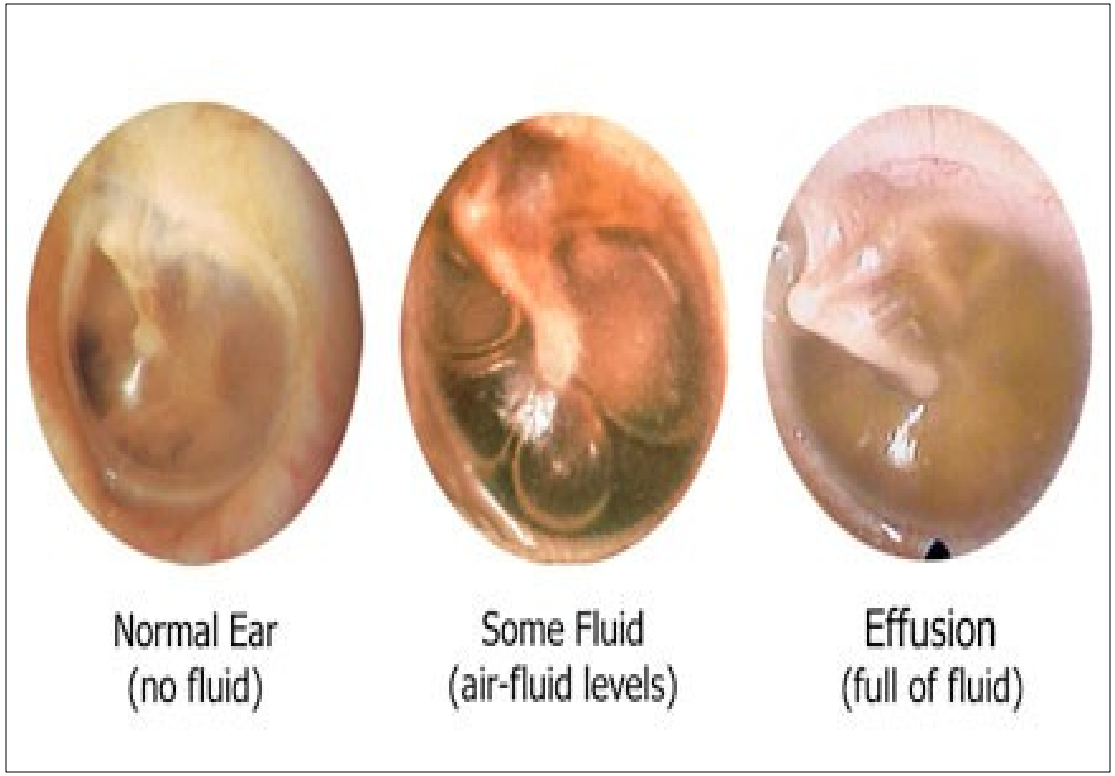


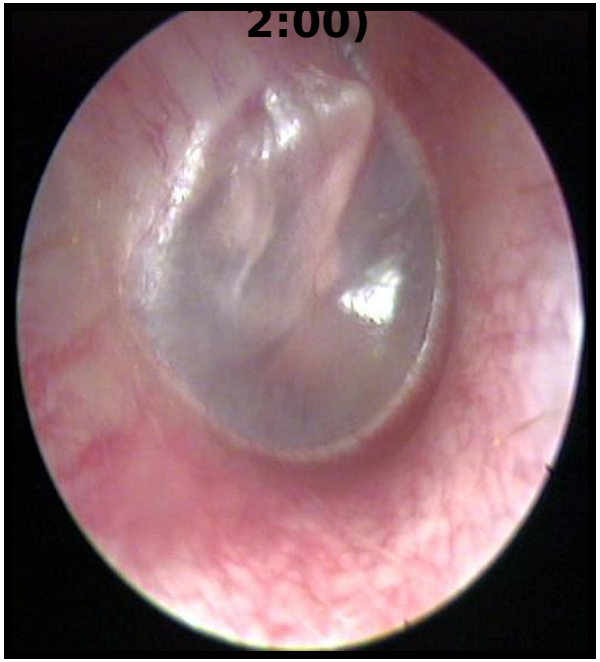
Figure 4.12 (a) During ascent, the ear drum bulges outward as air pressure in the outer ear declines while the pressure in the middle ear stays the same. (b) During descent, the ear drum bulges inward as air pressure in the outer ear increases while pressure in the middle ear remains the same. (c) Opening of the eustachian tube equalizes the pressure in the middle and outer ear and the ear drum flattens with a popping sound. [After Jack Williams, *USA Today: The Weather Book*. Copyright 1992 Vintage Books, New York, New York.]

Outer & Middle Ears

Middle Ear Effusion Serous Otitis Media

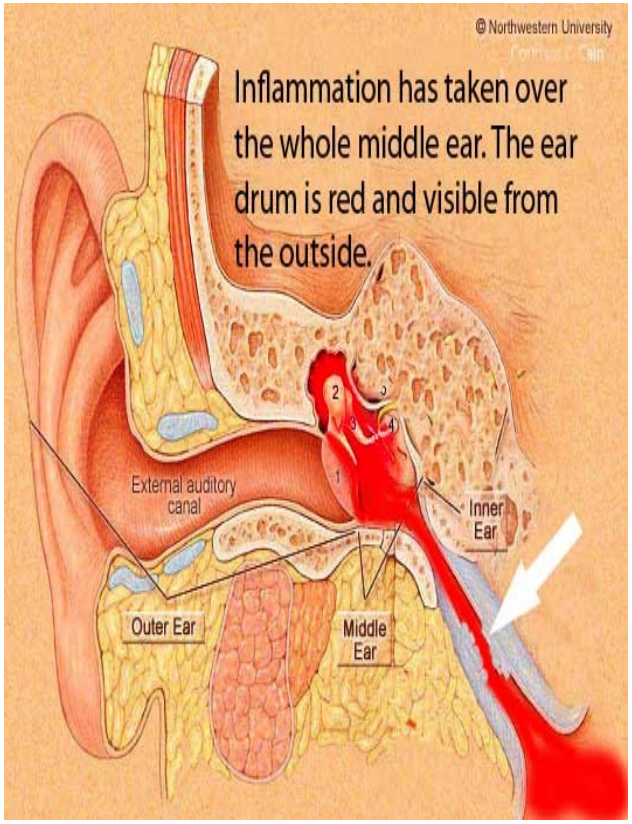


Fluid line (7:00 to 2:00)

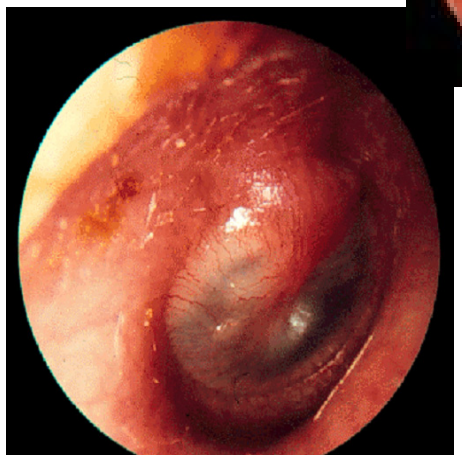


Outer & Middle Ears

Otitis Media or Middle Ear Infection


© Northwestern University
Inflammation has taken over the whole middle ear. The ear drum is red and visible from the outside.
External auditory canal
Inner Ear
Outer Ear
Middle Ear

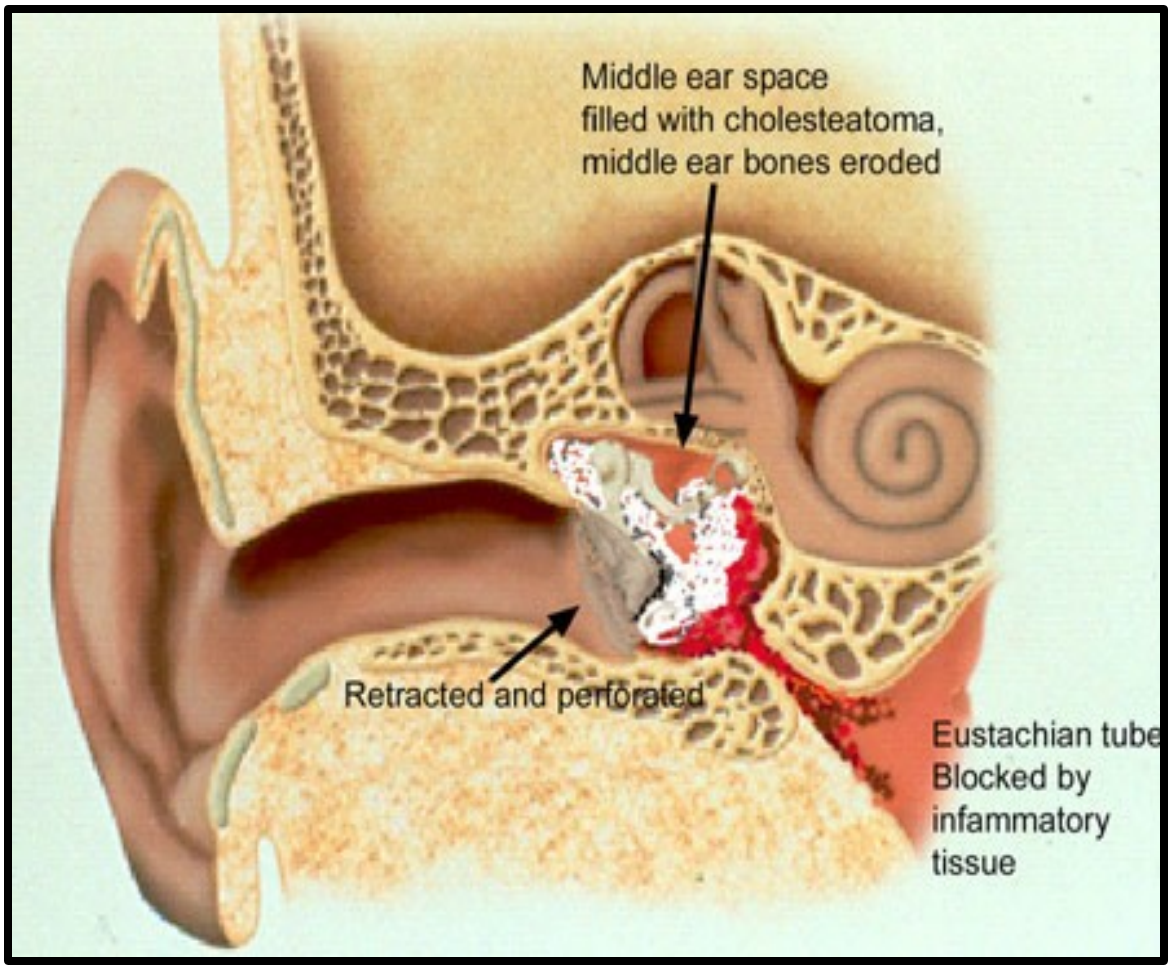
Acute Otitis Media (ear infection)

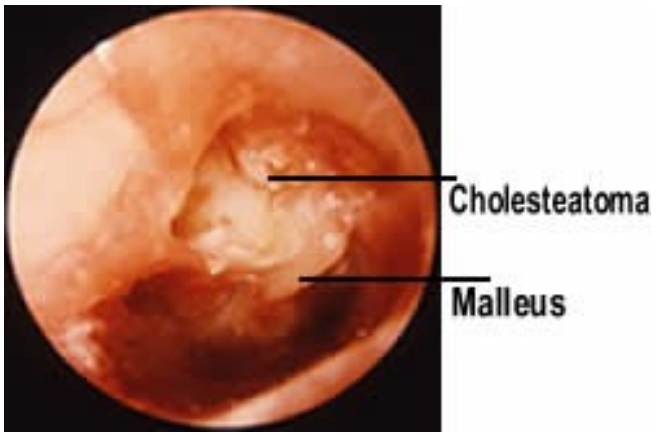


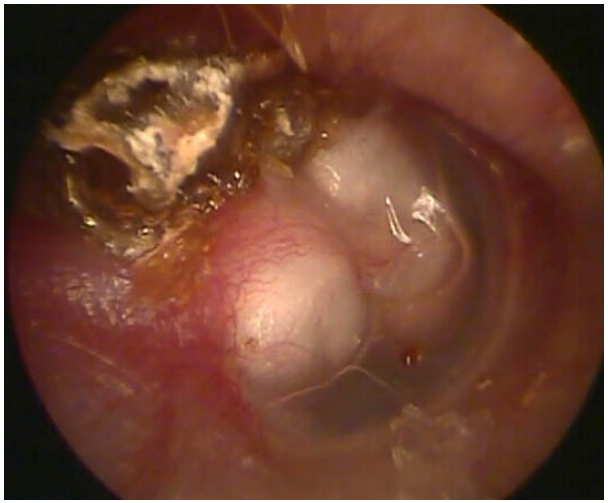
Outer & Middle Ears

Conductive Hearing Loss: Diseases/Disorders cont…

Cholesteatoma

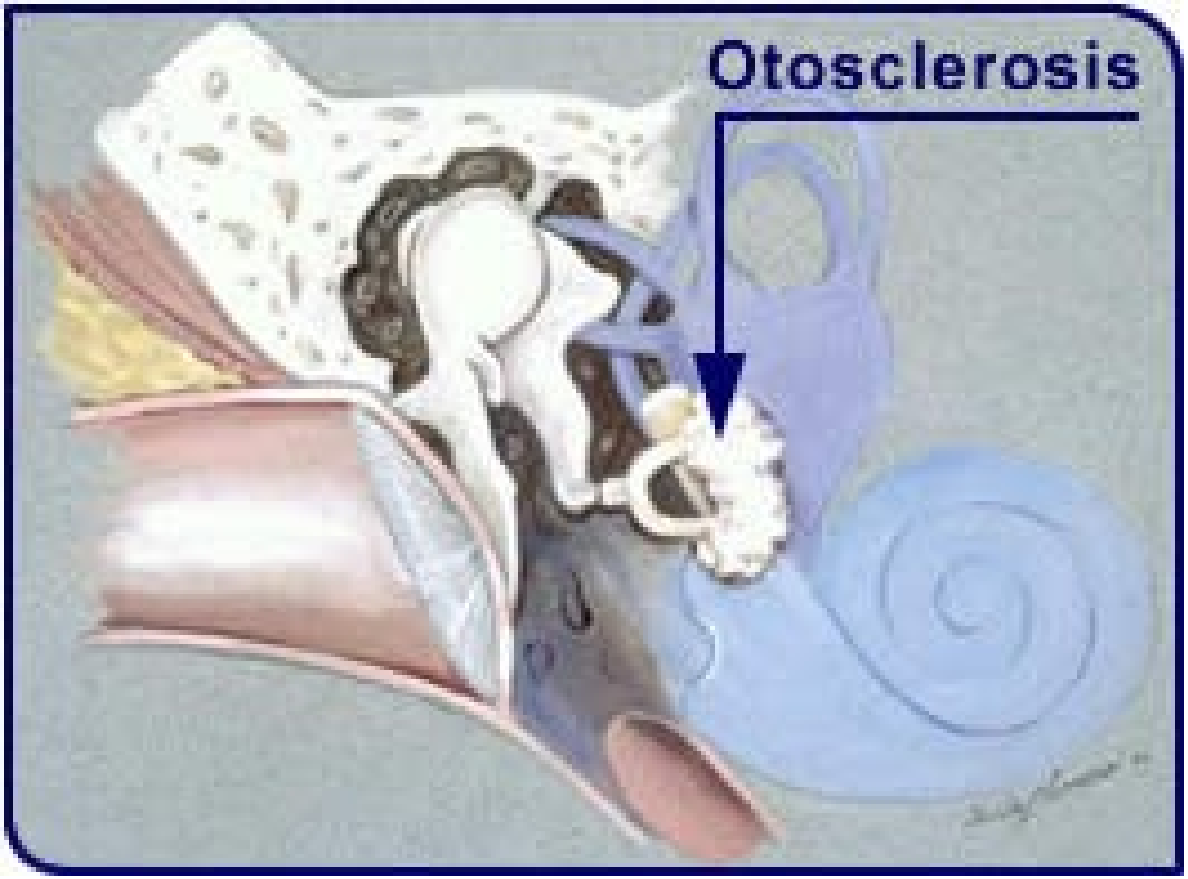


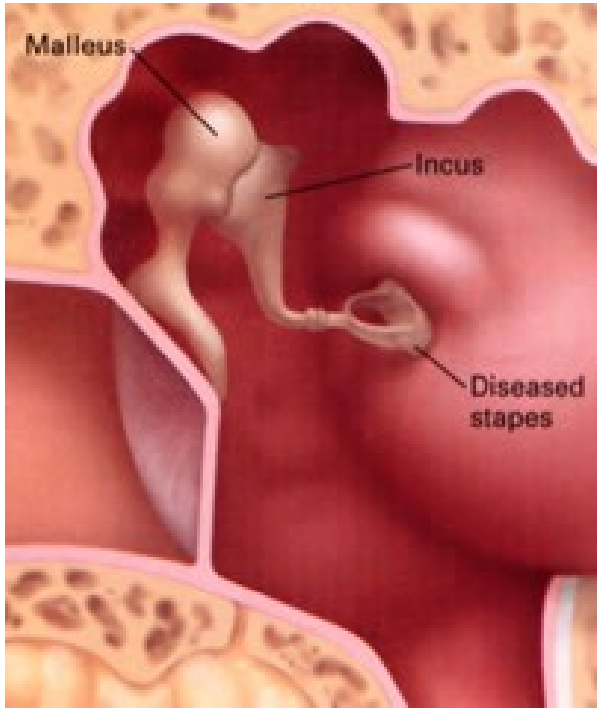




Outer & Middle Ears

Otosclerosis





Outer & Middle Ears

CONDUCTIVE HEARING LOSS
Treatment

1. **Medications**
2. **Surgery**
3. **Good ear hygiene**
4. **Hearing aids**

Conductive Hearing Loss problem

a) **temporary**

b) **loudness**

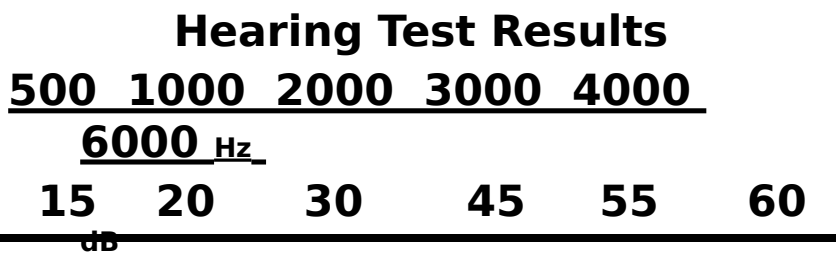
Inner Ear

SENSORINEURAL HEARING LOSS

Symptoms

- "Can hear but trouble understanding " due to distorted speech sounds
- May hear well in quiet but difficulties in noise
- Talks loudly
- Tinnitus
- Balance difficulties
- Hx: illness, head

High frequency hearing loss



Normal otoscopic exam

tympanogram

SENSORINEURAL HEARING LOSS

Diseases & Disorders

Inner Ear

BASIC PROBLEM

Organ of Corti and Hair Cells are

- **damaged**
- **destroyed**
- **undergoing pressure**

RESULT

Complete sounds can't be detected and/or transmitted creating...

ditored seech

"distorted speech"

Inner Ear

SENSORINEURAL HEARING LOSS

Causes of Inner Ear Damage

Ototoxins

- drugs
- chemicals

Head trauma

Aging

Auto-immune or unknown

Diseases

- bacterial/viral
- fluid pressure

Birth related

- genetic (DNA)
- fetal or birth

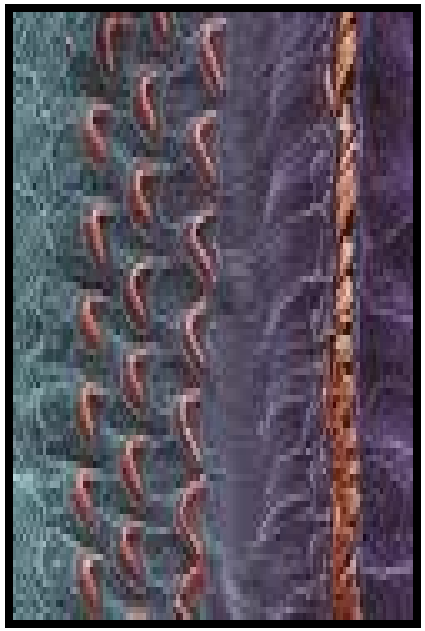
Hazardous noise exposure

Inner Ear

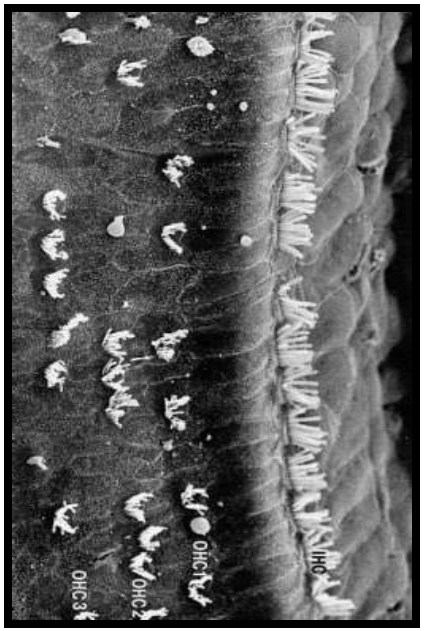
Noise Induced Hearing Loss (NIHL)

prolonged exposure ≥ 85 dB HL

sudden impulse/impact ≥ 140 dB Peak HL

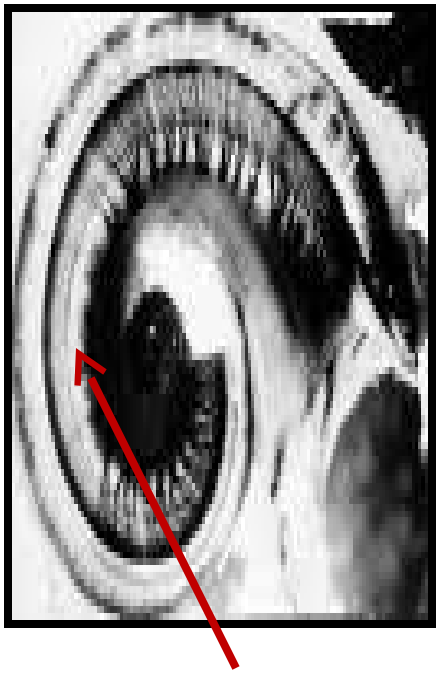


Normal



Damage

Normal



Damage

Inner Ear

SENSORINEURAL HEARING LOSS

Treatment

1.Medications & Surgery - limited

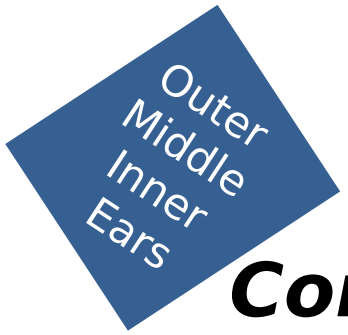
2.Hearing Aids

3.Adaptive Skills

Sensorineural Hearing Loss

a) permanent

b) understanding problem



MIXED HEARING LOSS

Conductive + Sensorineural = Mixed HL

ANY COMBINATION

Symptoms

Hearing Test Results

Disease/Disorders

Treatments

MOST COMMON

Permanent Sensorineural HL with Outer/Middle Ear disorder

OR

Impacted Cerumen (temporary conductive HL)

Auditory Nerves & Brain

CENTRAL HEARING LOSS
Symptoms

Asymmetrical hearing loss

Tinnitus - typically constant

Atypical difficulty with understanding speech in noisy conditions

Balance difficulties

Head trauma

Auditory Nerves & Brain

Central Hearing Loss: Symptoms cont…

Often hearing for tones is normal

Other neurological disorders present

Easily distracted by other sounds

May have learning difficulties

Confused with behavioral problems

Auditory Nerves & Brain

CENTRAL HEARING LOSS
Treatment

1. **Surgery for tumors/growths**
2. **Educational therapy**
3. **Adaptive techniques**

Central Hearing Loss ≈ **understanding problem**

NON-ORGANIC HEARING LOSS

Malingering

History

enlistment, deployment, discipline, avoid work, retirement, attention, monetary compensation

Inconsistent behaviors

Hearing test results inconsistent with

- hearing behaviors
- previous tests
- how ear functions

Testing behaviors

Conversion or Psychological Trauma

History

- Traumatic event – assault, rape, IED, war trauma

Not trying to avoid work

Not trying to obtain $$

Hearing test results inconsistent

Flat affect

Emotionless face

Patient believes has hearing loss

★ **Very rare condition**

NON-ORGANIC HEARING LOSS
"Treatment"

1. Follow regular protocols
2. Give reinstruction for test
3. Give person an "out"
4. Refer to audiologist
   - special test techniques
   - special tests
   - counseling

SUMMARY

The five types of hearing loss are based on the divisions and functions of the ear

1. **Conductive**
2. **Sensorineural**
3. **Mixed**
4. **Central**
5. **Non-Organic**

QUESTIONS?